

DoD Workshop SUR/FIN 2010

Commercial Fastener Coatings

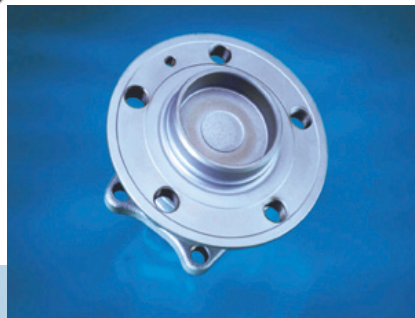
Dörken

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DELTA® protects surfaces.



Dörken

- A manufacturer, developer, and supplier of zinc-rich corrosion protective coating systems and technology.
- Primary Products and Trademarks:
 - DELTA®-TONE 9000 (Zinc Rich Basecoat)
 - DELTA-PROTEKT® KL 100 (Zinc Rich Basecoat)
 - DELTA®-SEAL (Organic Sealer, multiple colors)
 - DELTA-PROTEKT® VH (Clear Water-based sealer)
 - DELTACOLL® (Inorganic Sealer, multiple colors)



Ewald Dörken AG.

- Founded 1892
- 740 Employees, Exports to 30 countries, MKS reps. in 12 countries
- Global Tech-Center, Production, R&D located in Herdecke , Germany
- ~\$250 Million Annual Sales



Central Manufacturing

All product is manufactured in Germany

Benefits include:

Global availability

Global consistency

Centralized R&D

Environmental Compliance

Germany



Dörken MKS-Systems worldwide

Global Applicator List Available @ www.doerken-mks.com (infocenter, job coater)





Technical Center - Fastener Application Testing

Torque, Tension, Angle, Friction Testing



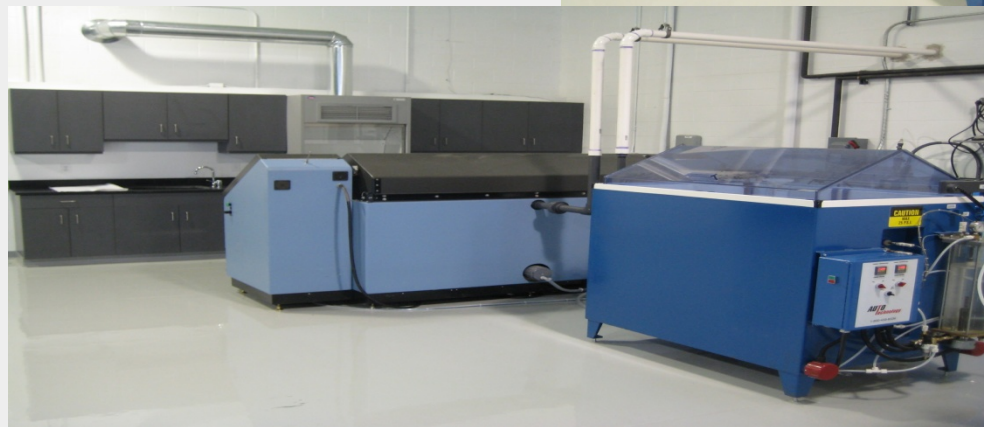
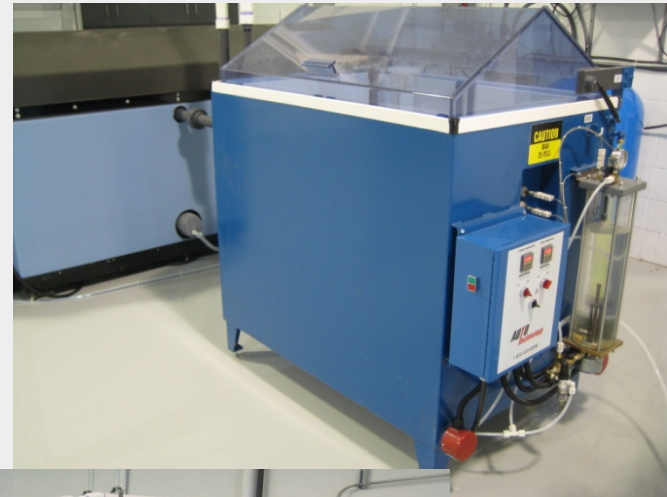
Technical Center – Coating Examination Testing

- Coating Thickness: X-Ray Fluorescence (Fischerscope)
- Coating Examination: Nikon Microscope
- Temperature and Humidity: ESPEC Platinous Chamber with Yokogawa Recorder



Technical Center – Corrosion Testing

- Cyclical Corrosion: Auto Technology Cyclical Corrosion Chamber
- Neutral Salt Spray Testing: Auto Technology Corrosion Test Chamber



The Delta-MKS Division of Dörken

- Over 30 years manufacturing and developing Zinc-Rich Corrosion Protective coating systems. (Delta®-Tone 9000)
- Solvent Based Chemistry Zinc-Rich Basecoats and Organic Topcoats.
- Water Based Chemistry for Clear Silicate Topcoats (Delta-Protect® VH Series)
- All Products are Composed of High Grade Materials which ensures the highest quality attributes in the finished product.



Product Lines

Micro coating anti-corrosion systems

Basecoat

Zn-Flake

DELTA®-Tone 9000
(Inorganic)

DELTA-PROTEKT®
KL 100 (Inorganic)

DELTA-PROTEKT®
KL 105 (Inorganic/Integral Lube)

DELTA-PROTEKT®
KL 108 (Inorganic/Hi
CoF)

DELTA-PROTEKT®
KL 101 (Inorganic)

Topcoat

for Zn-Flake Basecoat &
Phosphate

DELTA®-SEAL
(Organic)

DELTA-PROTEKT®
VH 300, 301, & 302
(Inorganic Water
based)

DELTA-PROTEKT®
VL 411 & 450 (UV)
(Organic)

DELTA®-Lube
Clear, Blue & Green
(Organic Water
Based)

Topcoat

for Electroplating

DELTACOLL®
(Inorganic)

DELTA PROTEKT®
VH 350, 351, & 352
(Inorganic Water
based)

Zinc Rich Basecoats: DELTA® -Tone 9000 and DELTA-PROTEKT® KL 100

Composition:

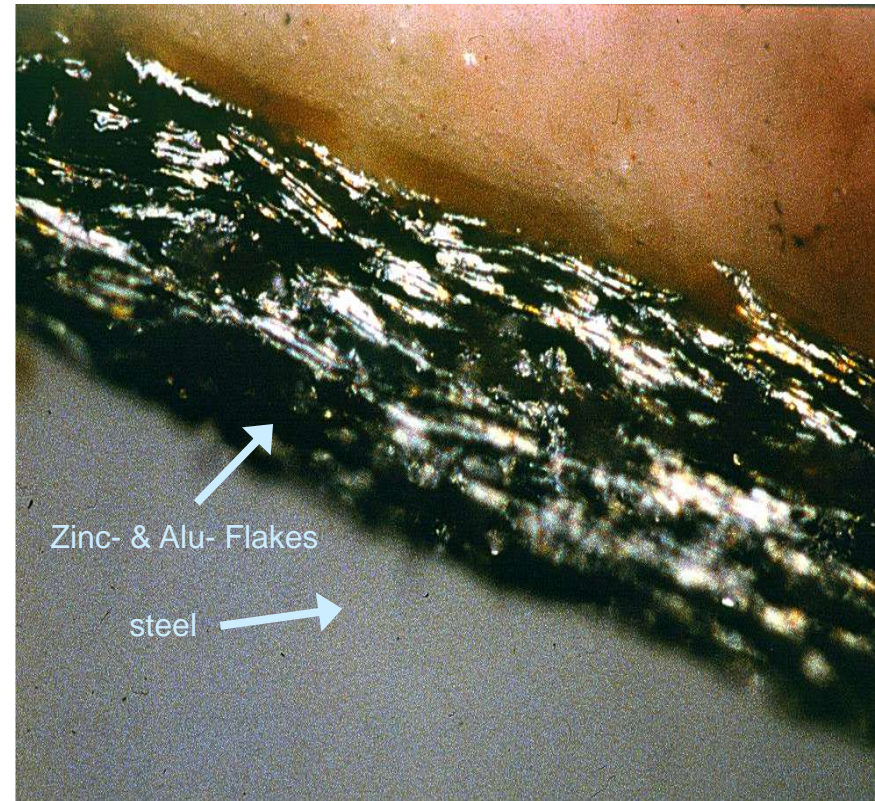
- >70% Zinc Metal in Milled Flake Form
- Titanium Binder
- ~10% Aluminum

In Applied Form:

- Typical Coating Thickness <10µm
- Conductive
- Silver / Grey Appearance

May Be Applied To:

- Bare Steel Substrates (Degreased)
- Zn or Fe Phosphated Substrates
- Other Metal Alloy Substrates



Dörken Zinc-Rich Coating Systems

- May be applied to fasteners $\geq M6$. Smaller fastener sizes possible with special processing. (Thin coating system, 5-25 μm)
- No Hydrogen Embrittlement Due to Process Technique
 - Suitable for High Strength Fasteners.
- Always Chromium (VI)-free
- Integrated Friction Modification for Consistent Torque in Assembly
 - Average $\mu_{\text{tot}} = 0.10 - 0.16$ (ISO16047)
 - Multiple friction levels available
- High Corrosion Protection
 - ASTM B117, ISO 9227 > 1000 Hours No Red Corrosion
 - ASTM G85 Annex 4 (SO_2) > 1000 Hours No Red Corrosion
 - GM9540P > 120 Cycles
 - SAE J2334 > 80 Cycles

DELTA®-TONE + DELTA®-SEAL



120 Cycles GM9540P – Delta-Protekt KL 100 and Delta-Seal GZ Silver



PANEL #3



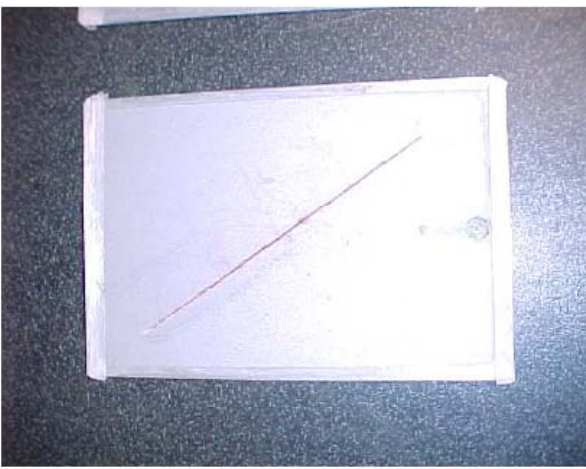
PANEL #4



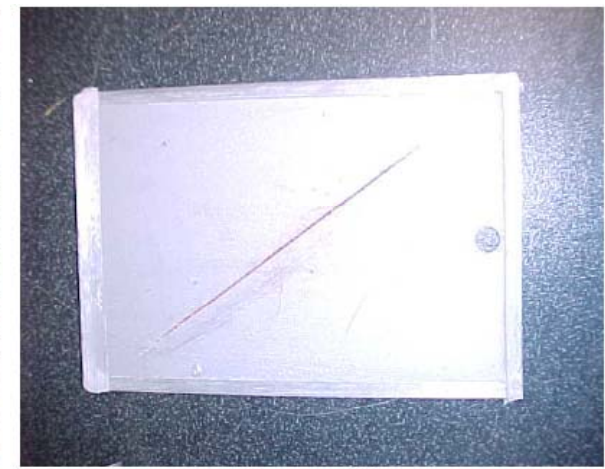
PANEL #5



PANEL #6



PANEL #7



PANEL #8

ASTM G85-02 Annex 4 – Salt Fog/SO₂

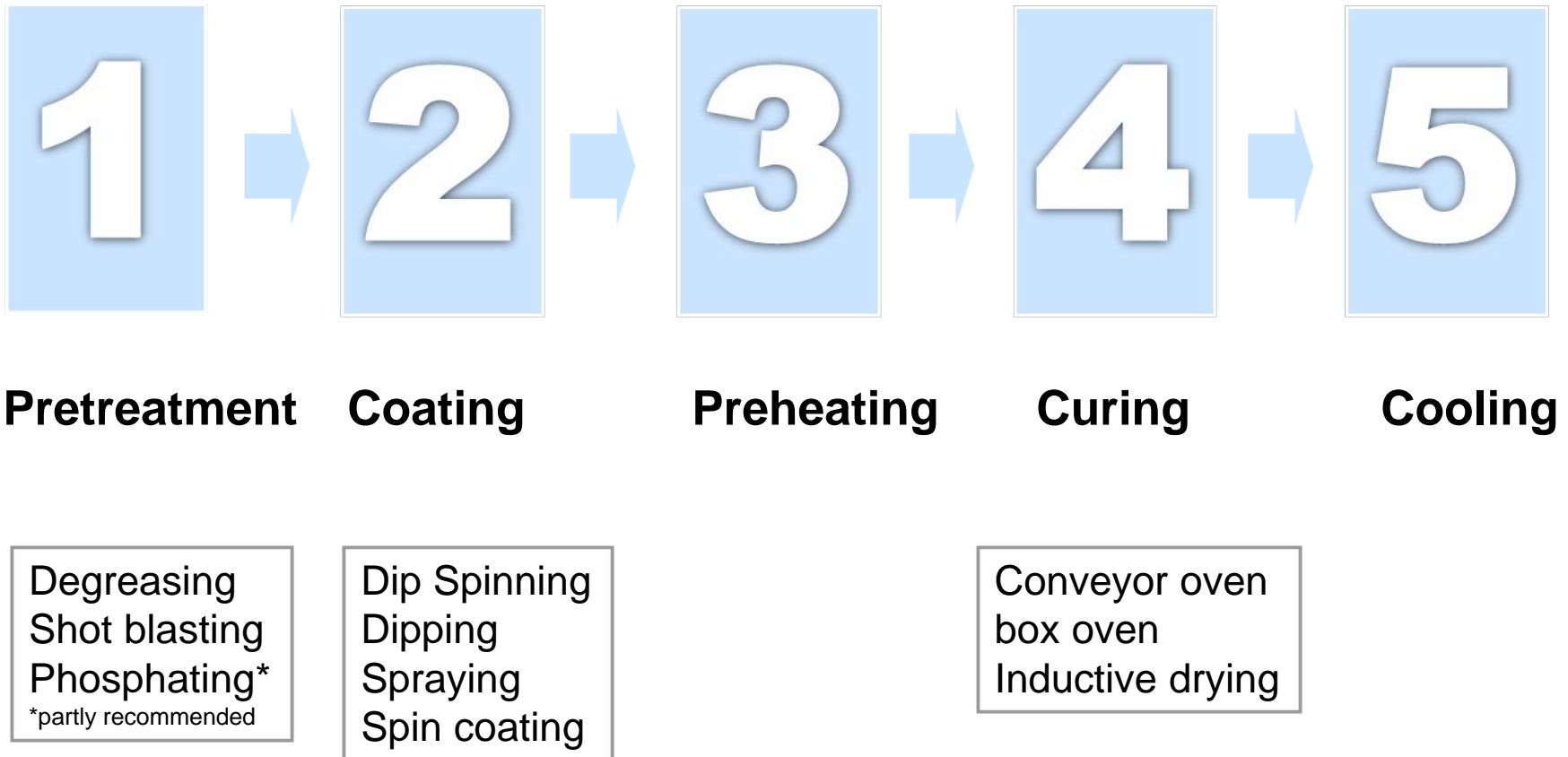
Delta-Protekt KL 100 and Delta-Seal GZ Silver: 1008 Hours ASTM G85-02 Annex 4

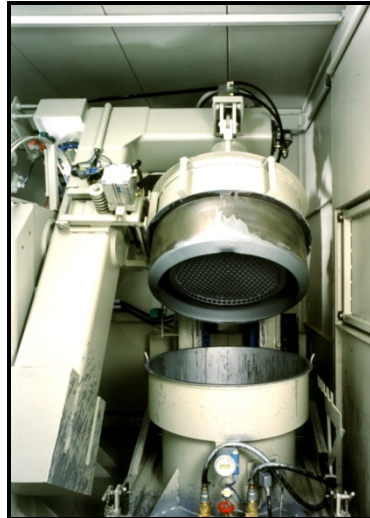
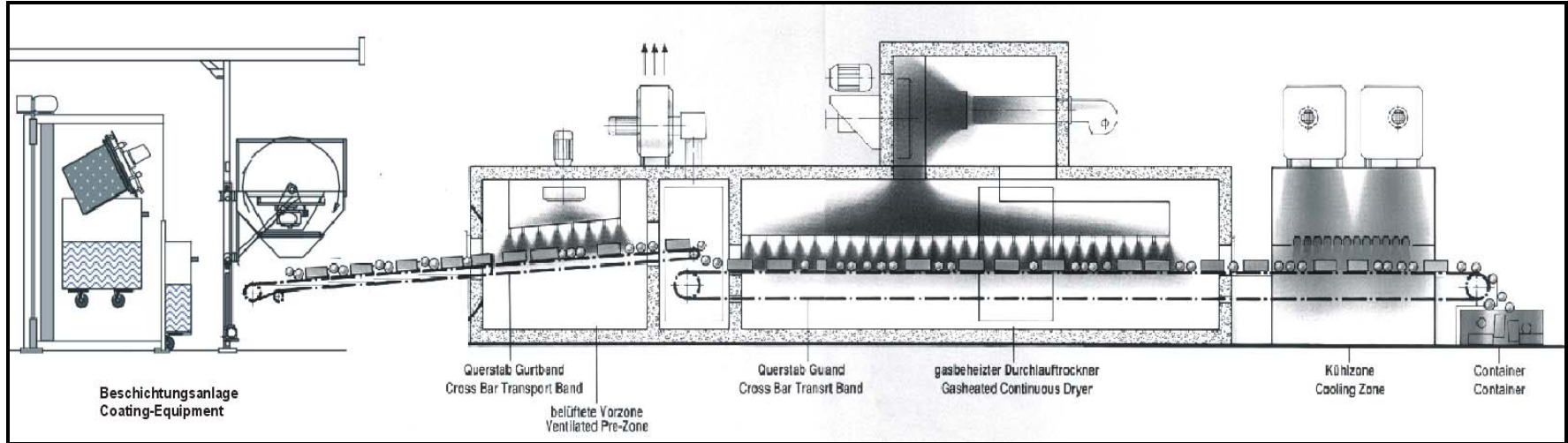


Delta-Protekt KL 101 >5000 Hours ASTM B117

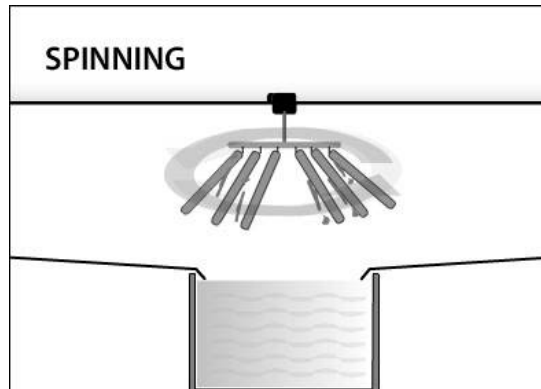
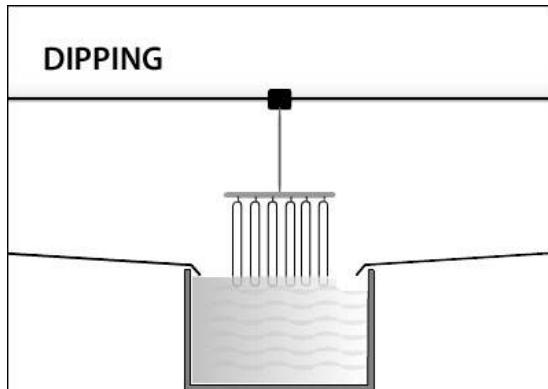
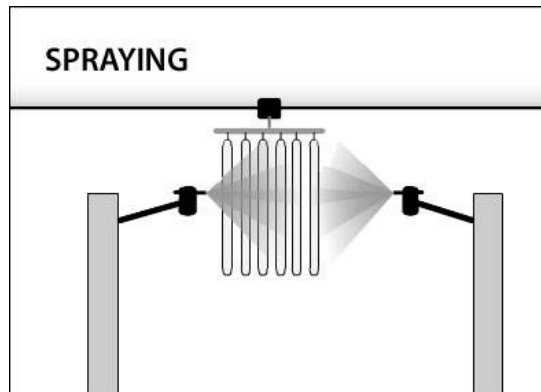
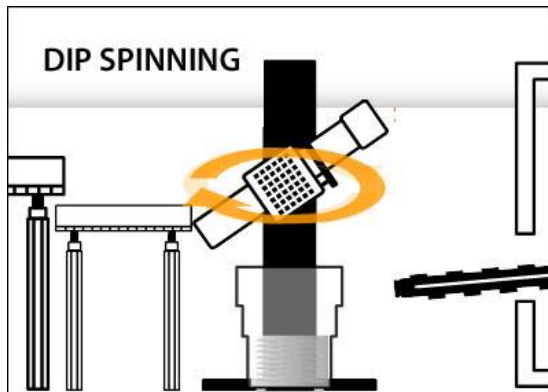


General application process.





Coating application techniques.



FASTENER SYSTEMS



BIG FASTENER SYSTEMS



STAMP PARTS



BIG PARTS



BRAKE DISCS



SPRINGS



Performance Specifications:

- ISO 10683 *Fasteners-Non-electrolytically applied zinc flake coatings*
- ASTM – Pending
- GMW 3359

Our markets.

AUTOMOTIVE



WIND ENERGY



AEROSPACE



CONSTRUCTION



ENGINEERING



OTHERS



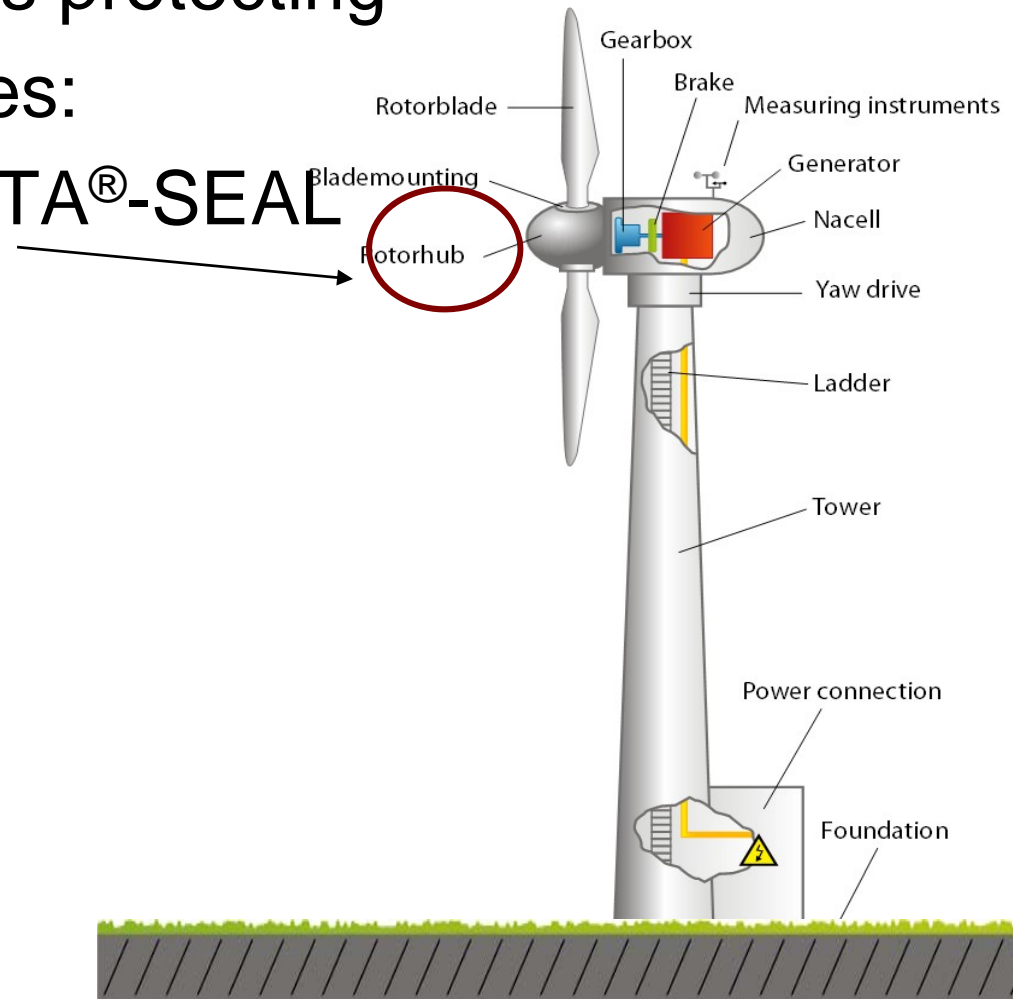
Approved by all major OEMs worldwide*



Wind Energy Applications

- 15 years experiences protecting rotorblade assemblies:

DELTA®-TONE + DELTA®-SEAL



Specification approval of the DELTA-MKS® systems.

Wind turbine manufacturer	Specification
Acciona Windpower (ES)	CS0129
BARD Engineering (GER)	Germanischer Lloyd Guidelines
Enercon (GER)	MK06000-0
Fuhrländer/W2E (GER)	W0402-G03-DASH
Gamesa Eólica (ES)	EQ630001
GE- Wind Energie (USA)	P14A-AL-0218
Kenersys (IND)	KSY_SPC_bolt
Suzlon (IND)	M0606600
Vestas (DK)	ERP 900182
Nordex (GER) Repower Systems (GER) Siemens Wind Power (DK)	In process

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